

Responding with Answers to Mass Marine Mammal Mortalities

Evening network news stories and headlines involving mass strandings and mortalities of fish and/or marine mammals such as dolphins and sea lions can present local coastal resource managers with the difficult questions of “Why? What caused it?” Answering that question can be complex, as local authorities may lack the resources to conduct and complete a full investigation including analyses for marine biotoxins that often a cause mass strandings.



The Mystery of Mass Strandings

Mass strandings and mortalities of marine mammals, such as dolphins, whales and seals, have become more widespread in recent years. In 2002, a stranding event reached from the Central California coast well into southern California and was the second largest marine mammal mortality event ever recorded in the U.S. Other U.S. coasts have also witnessed mass strandings. Hundreds of bottlenose dolphins have died in mortality events along the East Coast, and whales have been affected in the Northeast. Since 1990, five mass mortalities of bottlenose dolphins have occurred in the northern Gulf of Mexico, and in March - April 13, 2004, 107 bottlenose dolphins stranded along the Panhandle of Florida.

Marine mammals are the barometers of human health – identifying the cause of strandings is key to saving them.

be found at the local level. Toxic algal blooms have been increasing over recent years resulting in more frequent beach and shellfish bed closures. In addition, more

mass strandings of marine mammals are being linked to these outbreaks of Harmful Algal Blooms (HABs.) NCCOS sponsors and conducts extensive research on HABs, ranging from broad ecological

studies to biochemical analysis.

State and local resource managers rely on NOAA’s marine biotoxins analytical response capabilities to assess and analyze causes of marine mammal mortality events. NOAA/NCCOS scientists bring together expertise in algal taxonomy, toxicology, and toxin chemistry to provide local managers timely information involving shellfish harvesting, life support for marine mammals, beach closings, and other remedial actions. Drawing on their extensive experience with harmful algal blooms and the

Finding the Cause

Making the kinds of scientific analyses needed to understand these events requires a range of scientific capabilities unlikely to

toxins they produce, scientists use toxin-specific, instrument-based and animal-based detection methods to first screen then confirm the presence of individual toxins.

In a 1998 sea lion mortality event in California in which 57 sea lions died, NOAA scientists identified Domoic Acid (DA) as the cause. DA is a water-soluble amino acid found in various marine algae and a potent, often deadly neurotoxin to humans when consumed in contaminated mussels, clams, crabs, and anchovies. Knowing the specific cause through the NOAA early response analysis mechanism allowed veterinarians in the area to develop more effective preventive and protective treatments for poisoned sea lions, leading to increased survival rates for sea lions they treated.

In the Florida event, NOAA scientists found high levels of brevetoxin in stomach contents and in fish from the area, leading to new research on why dolphins in the northern Gulf of Mexico appear more susceptible than those off the southwest Florida coast. In Maine, the state's Department of Natural Resources, after having worked with NOAA scientists on field observations and analytical techniques, now sample sites for organisms and their toxins as part of routine shellfish toxin monitoring.

NOAA's unique event-mortality analysis capabilities have even proven critical in addressing such events overseas. Russia's Shirshov Institute of Oceanology, for instance, has worked with NOAA to investigate a coastal region prone to outbreaks of



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Diarrhetic Shellfish Poisoning, DSP, apparently the result of humans eating contaminated mussels in the Black Sea.

NOAA is continuing to assist scientists in other countries to better identify the specific causes of environmental health events to mitigate risk to humans, marine mammals, and other important biota.



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